BTEC Assignment Brief

Qualification	Pearson BTEC International Level 3 Subsidiary Diploma in Applied Science Pearson BTEC International Level 3 Foundation Diploma in Applied Science Pearson BTEC International Level 3 Diploma in Applied Science Pearson BTEC International Level 3 Diploma in Biomedical Science Pearson BTEC International Level 3 Diploma in Environmental Science Pearson BTEC International Level 3 Extended Diploma in Applied Science Pearson BTEC International Level 3 Extended Diploma in Biomedical Science Pearson BTEC International Level 3 Extended Diploma in Environmental Science
Unit number and title	**Unit 19:** Microbiology and Microbiological Techniques
Learning aims	**C:** Undertake aseptic techniques to culture microorganisms. **D:** Explore factors controlling microbial growth in industrial, medical and domestic applications.
Assignment title	**Culturing microorganisms**
Assessor	
Issue date	
Hand in deadline	

Vocational Scenario or Context	During your work experience placement within a Scientific Research facility you will gain an insight into their work in the study of microbiota and pathogen biology. You will have the opportunity to study various techniques used in cultivating microorganisms and learn the importance of aseptic techniques and biocontainment. On completion of your placement, you are expected to demonstrate the knowledge you have gained by carrying out your own investigations and reporting on the techniques used and results obtained.

Task 1	Produce a detailed report that **evaluates**, **analyses**, **compares** and **explains** techniques used in the cultivation of microorganisms. **Demonstrate skilful** application of aseptic techniques by carrying out practical investigations into the growth of microorganisms. • Throughout your practical investigations into microbial growth, you must work safely and with minimal guidance to **demonstrate skilful** aseptic techniques to avoid any possible contamination of yourself or others, the microbiological cultures or your working environment. You must prepare a suitable risk assessment to demonstrate your understanding of the risks involved and precautions to

	be taken when working with microorganisms and preparing and inoculating growth media. • **Compare and explain** the biocontainment methods used in your Centre against those used in industrial laboratories, including the reasons for any differences, and the possible impact of failing to adhere to specified biocontainment procedures. • You should **correctly and skilfully prepare** different types of growth media which you will inoculate to cultivate microorganisms. The methods used must include solid agar (spread plates) and liquid broth media (pour plates). • **Carry out** practical investigations to ascertain the effects of changing at least one environmental factor when cultivating microorganisms (e.g. nutrients, pH, temperature, light, oxygen levels and growth surfaces). Use the results and measurements from your practical investigations to **explain** the environmental requirements for microbial growth and how growth inhibitors (e.g. antibiotics, antiseptics) work to control the growth of different microorganisms. • You must precisely measure, average and record the resultant microbial growth in different media which you will then analyse to draw conclusions about how changing environmental factors affects the growth of microorganisms. Your analysis should be supported by secondary data which must be properly referenced. • Your report must include a detailed **evaluation** of the preparation of growth media and the aseptic and inoculation techniques you have used in culturing different microorganisms. After using your chosen techniques to culture different microorganisms, you must **evaluate** how effective each medium/method and inoculation technique was in terms of you being able to accurately analyse the effects on microbial growth suggesting alternative methods or equipment that might enhance the results you achieved. The techniques you used must be compared with the techniques used by other learners in your group and you must give suggestions as to how improvements could be made. You must make specific reference to the biocontainment procedures used for each type of growth media and the methods of inoculation chosen.
Checklist of evidence required	A report that includes: • An evaluation of the techniques and biocontainment methods used when culturing microorganisms. • A demonstration of the use of skilful techniques in the preparation of growth media, inoculation of plates and accurate measurement of cultures. • Investigations and analysis of the environmental factors that affect the growth of microorganisms. • A record showing the methods/techniques used and results obtained in the microbiology practical investigations. This could be supported by a signed observation record completed by your Assessor. • An explanation of how growth inhibitors affect microorganisms.

	• An explanation and comparison of the biocontainment methods used in schools/colleges and industry.
Criteria covered by this task:	
Unit/Criteria reference	To achieve the criteria, you must show that you are able to:
CD. D2	Evaluate own aseptic techniques used to culture microorganisms with specific reference to the type of media, methods of inoculation chosen and the biocontainment procedures carried out.
C. M3	Demonstrate skilful application of aseptic techniques in inoculation and preparation of growth media and in measuring microbial growth.
C. M4	Compare biocontainment procedures in your centre laboratory to those used in industrial laboratories.
D. M5	Analyse how growth of microorganisms is affected by changing environmental factors.
C. P4	Correctly prepare and inoculate growth media and measure microbial growth using aseptic techniques.
C. P5	Explain biocontainment procedures in your centre laboratory and within industrial laboratories.
D. P6	Carry out investigations into the effect of growth requirements on microorganisms.
D. P7	Explain how growth inhibitors affect microorganisms.

Sources of information to support you with this Assignment	http://www.nuffieldfoundation.org/practical-biology/investigating-anti-microbial-action http://www.nuffieldfoundation.org/practical-biology/aseptic-techniques http://www.biotopics.co.uk/microbes/tech.html http://www.nuffieldfoundation.org/practical-biology/making-spread-or-%E2%80%98lawn%E2%80%99-plate http://www.nuffieldfoundation.org/practical-biology/making-pour-plate